AD-A163 562 OPERATIONAL TEST PLAN FOR THE FLY AWAY PROPULSION SYSTEM(U) TRACOR MARINE PORT EVERGLADES FL OCEAN TECHNOLOGY DIV 05 DEC 83 83-723519-1 1/1

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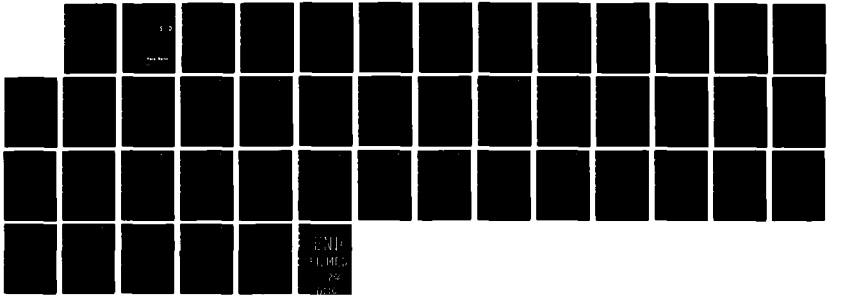

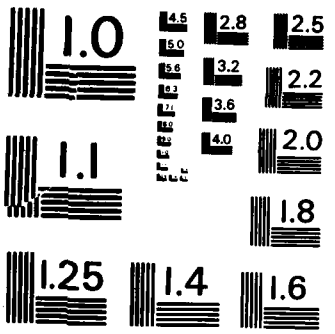


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# Operational Test Plan

# for the

# Fly Away Propulsion System

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Prepared for:

Department of the Navy
Chesapeake Division
Navy Facilities Engineering Command
Building 212, Washington Navy Yard
Washington, D.C. 20374

Prepared by:

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Report No. 83-723519-1

5 December 1983

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19. ABSTRACT (Continue on reverse if necessary & identify by block number)
The CHESNAVFACENGCOM Ocean Construction Equipment Inventory (OCEI) includes a Fly-Away Propulsion System designed to provide positioning capability on platforms-of-opportunity which may be required to support certain field operations. The system was manufactured by Maritime Industries Ltd (Con't)

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# Operational Test Plan

# for the

# Fly Away Propulsion System

Prepared for:

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## 1.0 INTRODUCTION

The CHESNAVFACENGCOM Ocean Construction Equipment Inventory (OCEI) includes a Fly-Away Propulsion System designed to provide positioning capability on platforms-of-opportunity which may be required to support certain field operations. The system was manufactured by Maritime Industries Ltd (MIL) and is comprised of six modules including two diesel-hydraulic 360° azimuthing thrusters, two GM 12V71 diesel power packs, a fuel module, and a control module. The six modules have a combined weight of 45,800 pounds (wet).

This document provides an operational test plan for the MIL System including dock trials, bollard pull test, speed trials, stationkeeping trials, and maneuvering trials. The primary purpose of these trials is to gather baseline performance data on the system and to provide a training opportunity for potential users. The system is assembled on the YFN-1060, 110' x 34' barge on loan from Naval Supply Center, Norfolk, Va. The tests will be conducted at the OCEI Facility in St. Juliens Creek, Portsmouth, Virginia, and on the nearby Elizabeth River.

In addition to the detailed procedures, data sheets are provided to record the results of each test. Sketches of platform movements and photographs of the operation will be made to provide further documentation.

Readers are referred to MIL manuals, volumes I-V for the operation instruction for each module.

## 2.0 DOCK TRIALS

### 2.1 General

The purpose of dock trials is to demonstrate th · the propulsion system is fully operative and ready for sea t · ls.

### 2.2 Trial Location

This trial will be done while alongside a strong dock. Water depth should be 6 feet greater than the deepest thruster projection.

### 2.3 Special Equipment Required

A stop watch

### 2.4 Procedure

2.4.1 Strongly secure the barge to a dock. Thrusts up to 12,000 lbs. are anticipated.

2.4.2 Start the equipment and allow it to reach operating temperature.

2.4.3 Rotate each thruster through 360° 5 times, both clockwise and counter clockwise. Record the times required for the full 5 rotations.

2.4.4 Ahead runs - Thrust direction at 0°

Run 1 - Turn both propellers at 140 RPM for 15 min.
Run 2 - Turn both propellers at 275 RPM for 15 min.
Run 3 - Turn both propellers at 410 RPM for 15 min.
Run 4 - Turn both propellers at max RPM for 15 min.

2.4.5 Astern Runs - Thrust direction at 180°

Run 1 - Turn both propellers at 275 RPM for 15 min.
Run 2 - Turn both propellers at max RPM for 15 min.

2.4.6 Abeam Runs

Run 1 - Thrust direction 90° prop RPM 140 for 15 min.
Run 2 - Thrust direction 270° prop RPM 140 for 15 min.

2.4.7 Record instrument readings and control settings for each of the 8 runs above on the data sheets provided in Section 2.5 which follows.

2.4.8 Note any unusual noises, vibrations, instrument readings, etc.

## 2.5 Data Sheets - Dock Trials

### 2.5.1 Description of Trial Area

Location: _____

_____

_____

Water Depth: _____

### 2.5.2 Equipment Description

Stopwatch: Manufacturer _____

_____

Model _____

Last calibrated _____

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2.5.3 Barge Description

Length on deck_____

Beam_____

Depth of hull_____

Fore rake length_____

Aft rake length_____

Head log depth_____

Stern log depth_____

Deadrise_____

Tank Plan_____

_____

Skeg Description_____

_____

Installed position of thrusters_____

_____

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2.5.4 Dock Trial Data - Rotation Test

| Rotation Direction | Seconds for 5 rotations Port Unit | Starboard Unit |
|---|---|---|
| Clockwise | _____ | _____ |
| Counter Clockwise | _____ | _____ |

2.5.5 Dock Trial Data - Ahead Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Time | ___ | ___ | ___ | ___ |
| Prop RPM (P) | ___ | ___ | ___ | ___ |
| (S) | ___ | ___ | ___ | ___ |
| Thrust Direction (P) | ___ | ___ | ___ | ___ |
| (S) | ___ | ___ | ___ | ___ |
| Eng. Lube Oil Press (P) | ___ | ___ | ___ | ___ |
| (S) | ___ | ___ | ___ | ___ |
| Engine RPM (P) | ___ | ___ | ___ | ___ |
| (S) | ___ | ___ | ___ | ___ |
| Engine Coolant Temp. (P) | ___ | ___ | ___ | ___ |
| (S) | ___ | ___ | ___ | ___ |
| Throttle Position (P) | ___ | ___ | ___ | ___ |
| (S) | ___ | ___ | ___ | ___ |
| Compass Reading | ___ | ___ | ___ | ___ |

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## 2.5.6 Dock Trial Data - Astern Runs

| | Run 1 | Run 2 |
|---|---|---|
| Date | _____ | _____ |
| Time | _____ | _____ |
| Prop RPM (P) | _____ | _____ |
| (S) | _____ | _____ |
| Thrust Direction (P) | _____ | _____ |
| (S) | _____ | _____ |
| Eng. Lube Oil Press (P) | _____ | _____ |
| (S) | _____ | _____ |
| Eng. RPM (P) | _____ | _____ |
| (S) | _____ | _____ |
| Eng. Coolant Temp. (P) | _____ | _____ |
| (S) | _____ | _____ |
| Throttle Position (P) | _____ | _____ |
| (S) | _____ | _____ |
| Compass Reading | _____ | _____ |

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## 2.5.7 Dock Trial Data - Abeam Runs

| | Run 1 | Run 2 |
|---|---|---|
| Date | _____ | _____ |
| Time | _____ | _____ |
| Prop RPM (P) | _____ | _____ |
| (S) | _____ | _____ |
| Thrust Direction (P) | _____ | _____ |
| (S) | _____ | _____ |
| Eng. Lube Oil Press (P) | _____ | _____ |
| (S) | _____ | _____ |
| Eng. RPM (P) | _____ | _____ |
| (S) | _____ | _____ |
| Eng. Coolant Temp (P) | _____ | _____ |
| (S) | _____ | _____ |
| Throttle Position (P) | _____ | _____ |
| (S) | _____ | _____ |
| Compass Reading | _____ | _____ |

Comments:

## 3.0 BOLLARD TEST

### 3.1 General

The purpose of the Bollard Test is to determine the thrust available when the vessel is not moving through the water.

### 3.2 Test Location

The test will be conducted in waters near a strong shore mounted bitt. Thrusts of 12000 lbs. are anticipated. During the test the vessel will be positioned at least 150 feet from the nearest obstruction or shallow water. Water depth to be at least 33 feet. Current to be less than 1 knot.

### 3.3 Special Equipment Required

Dynamometer for measuring line pulls to 12000 lbs.

Tow cable - 150 feet long (minimum), 60,000 pound minimum breaking strength.

### 3.4 Procedure

3.4.1 While pierside, record vessel drafts, depth of water over top of propellers, current speed in test area, and wind velocity.

3.4.2 Connect the dynamometer to the shore side bitt. Rig a cable (150 feet or more) to the dynamometer which will later be secured to the barge.

3.4.3 Ahead Thrust

Secure the tow cable to the stern bitts and maneuver to the test area. Record instrument readings, control settings, and dynamometer readings for the following runs:

Run 1 - Both units - Thrust direction 0°, prop RPM = 140
Run 2 - Both units - Thrust direction 0°, prop RPM = 275
Run 3 - Both units - Thrust direction 0°, prop RPM = 410
Run 4 - Both units - Thrust direction 0°, max. prop RPM

3.4.4 Astern Thrust

Secure the tow cable to the forward bitts. Record instrument readings, control settings, and dynamometer readings for the following runs:

Run 1 - Both units - Thrust direction 180°, prop RPM = 140
Run 2 - Both units - Thrust direction 180°, prop RPM = 275
Run 3 - Both units - Thrust direction 180°, prop RPM = 410
Run 4 - Both units - Thrust direction 180°, max. prop RPM

3.4.5 Abeam Thrust

Secure the tow cable to the aft bitt starboard side. Record instrument readings, control settings, and dynamometer reading for the following runs:

With Both Thrusters

Run 1 - Both units - Thrust direction 90°, prop RPM = 140
Run 2 - Both units - Thrust direction 90°, prop RPM = 275
Run 3 - Both units - Thrust direction 90°, prop RPM = 410
Run 4 - Both units - Thrust direction 90°, max prop RPM

Run 3 - Both units - Thrust direction 90°, max prop RPM in starboard unit and -0- RPM in port unit.

With Starboard Thruster

Run 1 - Thrust direction 90° in both units, prop RPM 140 in starboard unit and 0 in port unit.

Run 2 - Thrust direction 90° in both units, prop RPM 275 in starboard unit and 0 in port unit.

Run 3 - Thrust direction 90° in both units, prop RPM 410 in starboard unit and 0 in port unit.

Run 4 - Thrust direction 90° in both units, max. prop RPM in starboard unit and 0 in port unit.

With Port Thruster

Note: Move tow cable to portside before making the following runs.

Run 1 - Thrust direction 270° in both units, prop RPM 140 in port unit and 0 in starboard unit

Run 2 - Thrust direction 270° in both units, prop RPM 275 in port unit and 0 in starboard unit.

Run 3 - Thrust direction 270° in both units, prop RPM 410 in port unit and 0 in starboard unit.

Run 4 - Thrust direction 270° in both units, max. prop RPM in port unit and 0 in starboard unit.

Note: When testing abeam thrust, it may be necessary to adjust the thrust direction slightly to keep the barge from rotating or secure the barge by a bridle.

## 3.5 Data Sheets - Bollard Test

### 3.5.1 Test Location Description

description_____

wind speed_____

wind direction_____

current speed_____

current direction_____

water depth_____

wave height_____

wave direction_____

water temperature_____

air temperature_____

height of stationary bitt above water_____

### 3.5.2 Vessel Condition

draft forward_____

draft aft_____

water depth over screws_____

### 3.5.3 Equipment Identification

tow cable: diameter_____
length_____
material_____

dynamometer: manufacturer_____
model_____
range_____
last calibrated_____

### 3.5.4 Bollard Test Data - Ahead Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Thrust Direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Compass Reading | | | | |
| Dynamometer load | | | | |

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### 3.5.5 Bollard Test Data - Astern Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Thrust Direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Compass Reading | | | | |
| Dynamometer load | | | | |

Comments:

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3.5.6 Bollard Test Data - Abeam Runs with Both Thrusters

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Thrust Direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Compass Reading | | | | |
| Dynamometer load | | | | |

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3.5.7 Bollard Test Data - Abeam Runs with Starboard Thruster

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Thrust Direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Compass Reading | | | | |
| Dynamometer load | | | | |

Comments:

## 3.5.8 Bollard Test Data - Abeam Runs with Port Thruster

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Thrust Direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Compass Reading | | | | |
| Dynamometer load | | | | |

Comments:

## 4.0 SPEED TRIALS

### 4.1 General

The purpose of the Speed Trial is to determine the free running speed of the barge equipped with the Fly Away Propulsion System.

### 4.2 Trial Location

The Speed Trials should be conducted on a straight measured course of approximately 1000 yards length. The measured course should additionally have an approach at each end of sufficient length for the vessel to accelerate to full speed. The water depth should be at least 30 feet. Ideally wind and current speed should be low; an estimate of each will be made at the time of each test run.

It is recommended that a support vessel be available at the test site to assist the barge should any difficulty be encountered.

### 4.3 Special Equipment Required

Stopwatch
Pelorus

## 4.4 Procedure

### 4.4.1 Ahead Trials

Maneuver to the nearest approach area of the measured course and record all instrument readings and control settings while making the following runs:

Run 1 — Steer the vessel to course heading, set thrusters at 0°, prop RPM at 275 and accelerate to steady state speed. Measure the time required to transit the course. Use the pelorus to observe the passage of the beginning and ending course markers.

Run 2 — Reverse the course heading and then reset the thrusters at 0°, prop RPM at 275 and accelerate to steady state speed. Measure the time required to transit the course.

Run 3 — Put the vessel back on the original course heading, set thrusters at 0°, prop RPM at maximum and accelerate to steady state speed. Measure the time required to transit the course.

Run 4 — Reverse the course heading, set thrusters at 0°, prop RPM at maximum, and accelerate to steady state speed. Measure the time required to transit the course.

4.4.2 Astern Trials

Record all instrument readings and control settings while making the following runs:

Run 1 With the vessel still on the reverse course heading, set thrusters at 180°, prop RPM at 275 and accelerate to steady state speed. Measure the time required to transit the course.

Run 2 Put the vessel back on the original heading, set thrusters at 180°, prop RPM at 275 and accelerate to steady state speed. Measure the time to transit the course.

Run 3 Put the vessel on the reverse course heading, set thrusters at 180°, prop RPM at maximum and accelerate to steady state speed. Measure the time to transit the course.

Run 4 Put the vessel on the course heading, set thrusters at 180°, prop RPM at maximum and accelerate to steady state speed. Measure the time to transit the course.

Note: Making high speed astern runs may create excessive wave height at the thrusters endangering the equipment. If this happens, reduce prop RPM by 100 and make the run again.

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## 4.5 Data Sheets - Speed Trials

### 4.5.1 Measured Course Description

length: _____

heading: _____

water depth: _____

current speed: _____

current direction: _____

wind speed: _____

wind direction: _____

water temperature _____

air temperature _____

wave height: _____

wave direction: _____

_____

marker descriptions: _____

_____

general location: _____

_____

_____

### 4.5.2 Vessel Condition

draft forward _____

draft aft _____

water depth over screws _____

### 4.5.3 Equipment Identification

Stopwatch: manufacturer _____
model _____
last calibrated _____

Pelorus: manufacturer _____
model _____
description _____

4.5.4 Speed Trial Data - Ahead Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Thrust Direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Position (P) | | | | |
| (S) | | | | |
| Compass Reading | | | | |
| Transit Time | | | | |

Comments:

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4.5.5 Speed Trial Data - Astern Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Thrust Direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Position (P) | | | | |
| (S) | | | | |
| Compass Reading | | | | |
| Transit Time | | | | |

Comments:

# 5.0 STATION KEEPING TRIALS

## 5.1 General

The purpose of the station keeping trials is to determine the ability of the fly-away propulsion system to keep station unassisted.

## 5.2 Trial Location

The station keeping trials should be conducted in an area with 1-2 knots of current and a depth of at least 15 feet. Adequate area clear of shipping must be available for maneuvering.

## 5.3 Special Equipment Required

marker buoy
anchor for buoy
anchor line

## 5.4 Procedure

5.4.1 Place the marker buoy in the test area. The scope of the marker buoy anchor line should be limited to minimize the watch circle.

5.4.2 Proceed with the vessel to the test area and record all instrument readings and control settings while making the following runs:

Run 1 Set a course into the current and maneuver alongside the marker buoy. Hold station with the buoy for 10 minutes.

Run 2 Set a course with the current and maneuver alongside the marker buoy. Hold station with the buoy for 10 minutes.

Run 3 Set a course perpendicular to the current and maneuver just downstream of the marker buoy. Hold station with the buoy for 10 minutes.

Run 4 Set a course perpendicular to the curent and maneuver just upstream of the marker buoy. Hold station with the buoy for 10 minutes.

Run 5 Set a course with the current on the stern quarter port side and maneuver alongside the marker buoy. Hold station with the buoy for 10 minutes.

## 5.5 Data Sheets - Station Keeping Trials

### 5.5.1 Description of Trial Area

location_____
_____
_____

water depth_____
current speed_____
current direction_____
wind speed_____
wind direction_____
wave height_____
wave direction_____

### 5.5.2 Vessel Condition

draft forward_____
draft aft_____
water depth over screws_____

### 5.5.3 Equipment Identification

bouy description_____
rope length_____
anchor description_____

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5.5.4 Station Keeping Data

| | Run 1 | Run 2 | Run 3 | Run 4 | Run 5 |
|---|---|---|---|---|---|
| Date | | | | | |
| Time | | | | | |
| Prop RPM (P) | | | | | |
| (S) | | | | | |
| Thrust Direction (P) | | | | | |
| (S) | | | | | |
| Engine Lube Oil Press (P) | | | | | |
| (S) | | | | | |
| Engine RPM (P) | | | | | |
| (S) | | | | | |
| Engine Coolant Temp (P) | | | | | |
| (S) | | | | | |
| Throttle Position (P) | | | | | |
| (S) | | | | | |
| Compass Reading | | | | | |

Comments:

# 6.0 MANEUVERING TRIALS

## 6.1 General

The purpose of the maneuvering trials is to determine the ability of the Fly Away Propulsion System to change course, particularily at low speeds. The maneuvering trial plan which follows is very aggressive. Several of the intermediate RPM trials can be sacrificed without severely degrading the overall test objectives.

## 6.2 Trial Location

The maneuvering trials will be conducted on two buoy marked courses. Water depth should be 33 feet or more. Current and wind speed should be moderate.

### 6.2.1 Turning Course

A turning course trial will be run to simulate a cable laying operation in a cable field. The turning course should be a buoy marked lane 85 feet wide and 200 yards long. The course will be laid out in a constant turn of 4.5° every 10 yards. This means the course will be one fourth of the circumference of a circle having a 260 yard diameter.

### 6.2.2 Figure Eight Course

The figure eight course will be marked by three buoys laid out in a straight line and spaced 200 feet apart. The buoys

should be numbered with the end buoys being #1 and #3 and the center buoy #2.

6.3 Special Equipment Required

- o 25-30 small marker buoys, anchors and line for buoys.
- o stopwatch.

6.4 Procedure

6.4.1 Forward Runs on Turning Course

Maneuver to the Turning Course and record instrument readings, control settings and transit time while marking the following runs:

Run 1 Adjust prop RPM and thrust direction for forward speed of approximately 1/2 knot. Review results of the speed trials to estimate required prop RPM. Transit the course to find the steady thrust direction required in both units to stay in the lane. Also measure the time required to make the transit.

Run 2 Repeat test at 1 knot.

Run 3 Repeat test at 1-1/2 knots

Run 4 Repeat test at 2 knots

6.4.2 Astern Runs on the Turning Course.

Record instrument readings, control settings, and transit time while making the following runs on the Turning Course.

Run 1 Adjust prop RPM and thrust direction for an astern speed of approximately 1/2 knot. Review results of speed trial to estimate required prop RPM. Transit the course to find the steady thrust direction required in both units to stay in the lane. Also measure the time required to make the transit.

Run 2 Repeat astern test at 1 knot.

Run 3 Repeat astern test at 1-1/2 knots

Run 4 Repeat astern test at 2 knots.

6.4.3 Forward Turning Circle Runs on Figure Eight Course

Maneuver to the Figure Eight Course and record instrument readings, control settings and transit time while making the following runs:

Run 1 Adjust Prop RPM and thrust direction for a forward speed of approximately 1/2 knot. While passing inside of buoy #1 and #3, make several complete clockwise circles around buoy #2 reducing the diameter of the circle with each turn. Estimate the diameter of the minimum turning circle and the steady thrust direction required at the 1/2 knot speed.

Run 2 Repeat test at 1 knot in a counterclockwise direction.

Run 3 Repeat test at 1-1/2 knots, clockwise.

Run 4 Repeat test at 2 knots, counterclockwise.

6.4.4 Astern Turning Circle Runs on the Figure Eight Course.

Record instrument readings, control settings and transit time while making the following runs on the figure eight course:

Run 1 Adjust Prop RPM and thrust direction for an astern speed of approximately 1/2 knot. While passing inside of buoy #1 and #3, make several complete clockwise circles around buoy #2 reducing the diameter of the circle with each turn. Estimate the diameter of the minimum turning circle and the steady thrust direction required at the 1/2 knot speed.

Run 2 Repeat astern test at 1 knot, counterclockwise.

Run 3 Repeat astern test at 1-1/2 knots, clockwise.

Run 4 Repeat astern test at 2 knots, counterclockwise.

6.4.5 Forward Figure Eight Runs

Record instrument readings, control settings and transit time while making the following runs on the figure eight course:

Run 1 Adjust Prop RPM and thrust direction for a forward speed of approximately 1/2 knot. Transit the course leaving buoy #1 to port; #2 to starboard; #3 to port; turn about #3; pass #2 to port and #1 starboard.

Run 2 Repeat test at 1 knot.

Run 3 Repeat test at 1-1/2 knots

Run 4 Repeat test at 2 knots.

6.4.6 Astern Figure Eight Runs

Record instrument readings, control settings, and transit time while making the following runs on the figure eight course:

Run 1 Adjust Prop RPM and thrust direction for an astern speed of approximately 1/2 knot. Transit the course leaving buoy #1 to port; #2 to starboard; #3 to port; turn about #3; pass #2 to port; and #1 starboard.

Run 2 Repeat astern test at 1 knot

Run 3 . Repeat astern test at 1-1/2 knots

Run 4 Repeat astern test at 2 knots.

6.5 Data Sheets - Maneuvering Trials

6.5.1 Turning course description
location_____

_____

water depth_____

length of course_____

compass heading entering course_____

compass heading departing course_____

width of course_____

wind speed_____

wind direction_____

current speed_____

current direction_____

wave height_____

wave direction_____

water temperature_____

air temperature_____

# of marker buoys_____

6.5.2 Figure Eight Course description

location_____

_____

water depth_____

spacing between buoys_____

compass heading of buoys_____

wind speed_____

wind direction_____

current speed_____

current direction_____

wave height_____

wave direction_____

water temperature_____

air temperature_____

6.5.3 Equipment Identification

total # of buoys_____

description of buoys_____

_____

anchor type and weight_____

typical anchor line length _____

stopwatch manufacturer_____

Model #_____

Last calibrated_____

Tracor Marine

6.5.4 Maneuvering Data - Forward Runs on the Turning Course

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Steady Thrust direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Compass Reading when starting course | | | | |
| Transit time | | | | |

Comments:

Tracor Marine

6.5.5 Maneuvering Data - Astern Runs on the Turning Course

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Steady Thrust direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Compass Reading when starting course | | | | |
| Transit time | | | | |

Comments:

Tracor Marine

6.5.6 Maneuvering Data - Forward Turning Circle Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Steady Thrust direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Minimun Turning Circle diameter | | | | |
| Rotation direction (CW/CCW) | | | | |

Comments:

## 6.5.7 Maneuvering Data - Astern Turning Circle Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Steady Thrust direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Minimun Turning Circle diameter | | | | |
| Rotation direction (CW/CCW) | | | | |

Comments:

Tracor Marine

6.5.8 Maneuvering Data - Forward Figure Eight Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Steady Thrust direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Transit time | | | | |
| Compass heading when beginning course | | | | |
| Buoy # 1 passed to port or starboard? | | | | |

Comments:

Tracor Marine

6.5.9 Maneuvering Data - Astern Figure Eight Runs

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---|---|---|---|---|
| Date | | | | |
| Time | | | | |
| Prop RPM (P) | | | | |
| (S) | | | | |
| Steady Thrust direction (P) | | | | |
| (S) | | | | |
| Engine Lube Oil Press (P) | | | | |
| (S) | | | | |
| Engine RPM (P) | | | | |
| (S) | | | | |
| Engine Coolant Temp (P) | | | | |
| (S) | | | | |
| Throttle Positions (P) | | | | |
| (S) | | | | |
| Transit time | | | | |
| Compass heading when beginning course | | | | |
| Buoy # 1 passed to port or starboard? | | | | |

Comments:

END

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